CLAIMS

1. A flexible pipe for transporting a fluid in a marine environment, the pipe comprising a) a liner (1) for confining the fluid to be transported by the pipe, b) an armouring layer (3) surrounding the liner, c) an outer protective sheath (5) surrounding the armouring layer, wherein said outer protective sheath comprises at least two protective layers (51, 52) of helically wound composite wires (53), said at least two layers being wound with essentially opposite winding angles and being locally held together (55).

2. A flexible pipe according to claim 1 wherein said at least two protective layers have adjacent surfaces of contact comprising areas which are held together and areas with are un-tied to each other.

3. A flexible pipe according to claim 2 wherein said at least two protective layers are locally held together to provide local fixation of the wires of one layer with respect to the other layer, while allowing for shear deformation between the protective layers in areas of said adjacent surfaces that are un-tied to each other.

4. A flexible pipe according to any of claims 2 or 3 wherein said at least two protective layers are held together by a localized bonding implemented by a glue or a heat– or pressure-induced localized melting, distributed on said adjacent surfaces of contact in points or distinct spots or along one or more linear or curved paths.

5. A flexible pipe according to any one of claims 2-4 wherein said at least two protective layers are held together by at least one discrete string of binding material located on said adjacent surfaces of contact, said string of binding material extending in a longitudinal direction of the flexible pipe and crossing the composite wires of said protective layers.

6. A flexible pipe according to claim 5 wherein a multitude of essentially linear and continuous strings of binding material are distributed around the periphery of the contacting surfaces of adjacent protective layers.

7. A flexible pipe according to any of claims 5 or 6 wherein said binding material is chosen from the group hot melt adhesive, thermoplastic polymer, cross linked polymer adhesive, vulcanizing paste.

8. A flexible pipe according to any one of the preceding claims wherein said composite wires comprise a number of chords, at least one of said chords being locally linked to at least one neighbouring chord.

9. A flexible pipe according to claim 8 wherein said at least one chord is linked to said at least one neighbouring chord along their adjacent longitudinal surface.

10. A flexible pipe according to claim 9 wherein said at least one chord is fully or partially melted to said at least one neighbouring chord along their adjacent longitudinal surface.

11. A flexible pipe according to any one of claims 8-10 wherein each chord comprises a number of threads twisted around a longitudinal axis of the chord and at least one of said threads comprise a thread binding material.

12. A flexible pipe according to claim 11, wherein said threads are twisted around a central element.

13. A flexible pipe according to claim 12 wherein said central element comprises filaments of a metallic material such as copper or a copper alloy.

14. A flexible pipe according to any one of claim 8-13 wherein said chords constitute a tape-formed wire.

15. A flexible pipe according to any one of claims 11-14 wherein said thread binding material is chosen from the group of materials thermoplastic polymers such as polyolifin, polyurethane, rubbers that may be vulcanized.

16. A flexible pipe according to any one of claims 11-15 wherein said threads comprise a number of fibres or filaments.

17. A flexible pipe according to claim 16, wherein said fibres or filaments are chosen from the group of materials polyester, aramide, polyethylene, titanium, copper.

18. A flexible pipe according to claim 16 or 17 wherein said fibres or filaments are fully or partially protected by a jacket, a coating or an impregnation.

19. A flexible pipe according to any one of the preceding claims wherein a water-permeable intermediate layer (9) is located between said armouring layer (3) and said outer protective sheath (5).

20. A method of manufacturing a flexible pipe for transporting a fluid in a marine environment, the method comprising the steps of a) providing a liner for confining the fluid to be transported by the pipe, b) providing an armouring layer surrounding the liner, c) providing an outer protective sheath surrounding the armouring layer, wherein step c) comprises the sub-steps of c1) providing a composite wire, and c2) providing at least two protective layers, each layer being arranged by helically winding at least one of said composite wires, said at least two layers being wound with essentially opposite winding angles and being locally held together.

21. A method according to claim 20, wherein in step c2) at least one discrete string of binding material is applied to the contacting surfaces of neighbouring protective layers, said string of binding material being arranged to extend in a longitudinal direction of the flexible pipe and to cross the composite wires of said protective layers.

22. A method according to claim 20 or 21, wherein step c1) comprises the sub-steps of c1-1) providing a number of chords, and c1-2) arranging said chords to a wire so that at least one of said chords is locally linked to at least one neighbouring chord.

23. A method according to claim 22, wherein step c1-1) comprises the sub-steps of c1–1-1) providing a number of threads wherein at least one thread comprises a binding material, and c1-1-2) arranging said threads to a cord.

24. A method according to claim 23, wherein in step c1-1-2) said threads are twisted around a longitudinal axis of the chord.

25. A method according to claim 24, wherein step c1-1-1) comprises the sub-step of providing a central element and in step c1-1-2) said threads are wound around said central element.

26. A method according to any one of claims 22-25, wherein step c1-2) comprises the step of arranging a binding material between adjacent longitudinal surfaces of said neighbouring chords.

27. A method according to any one of claims 22-26, wherein step c1-2) comprises the step of arranging adjacent longitudinal surfaces of said neighbouring chords to be fully or partially melted together.